What Is Claimed Is:

1. A signal processing apparatus for processing a plurality of received signals obtained by receiving a signal or signals from a signal source or a plurality of signal sources through a plurality of reception apparatus, comprising:

first means for decomposing each of the received signals into a plurality of different frequency band signals;

second means for calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus; and

third means for estimating the direction or directions or the position or positions of the signal source or sources based on the cross correlation functions.

2. A signal processing apparatus according to claim 1, wherein said first means is formed from a plurality of band-pass filters for passing signals of frequency bands different from each other therethrough.

3. A signal processing apparatus according to

claim 1, wherein said third means includes:

maximum value detection means for determining delay times with which the cross correlation functions exhibit maximum values for the individual frequency bands for the individual combinations of the reception apparatus and setting the determined delay times as candidate delay times; and

estimation means for estimating the number and the direction or directions or the position or positions of the signal source or sources so that the candidate delay times may be provided most consistently.

4. A signal processing apparatus according to claim 1, wherein said third means includes:

normalization means for normalizing the cross correlation functions for the individual frequency bands;

addition means for adding the cross correlation functions normalized for the individual combinations of said reception apparatus over all or some plurality of ones of the frequency bands; and

estimation means for estimating the direction or directions or the position or positions of the signal source or sources based on results of the addition of the normalized cross correlation functions.

5. A signal processing apparatus according to

claim 4, wherein said estimation means determines the delay times with which the cross correlation functions added by said addition means exhibit maximum values for the individual combinations of said reception apparatus and sets the determined delay times as candidate delay times and then estimates the number and the direction or directions or the position or positions of the signal source or sources with which the candidate delay times are provided most consistently.

6. A signal processing apparatus according to claim 4, wherein said addition means performs, where the nature of the signal or each of the signals from the signal source or sources is known in advance, weighted addition so as to emphasize components originating from the received signals but suppress components which originate from noise.

7. A signal processing apparatus according to claim 1, wherein the signal source or each of the signal sources is a sound source.

8. A signal processing apparatus for processing a signal played back from a recording medium on which a signal or signals received from a signal source or a plurality of signal sources through a plurality of reception apparatus are recorded, comprising:

first means for decomposing each of the played back received signals into a plurality of different frequency band signals;

second means for calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus; and

third means for estimating the direction or directions or the position or positions of the signal source or sources based on the cross correlation functions.

9. A signal processing apparatus for processing a plurality of received signals obtained by receiving a signal or signals from a signal source or a plurality of signal sources through a plurality of reception apparatus, comprising:

first means for decomposing each of the received signals into a plurality of different frequency band signals;

second means for calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception

apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus;

third means for estimating delay times of individual ones of said reception apparatus which depend upon the direction or directions or the position or positions of the signal source or sources and an arrangement of said reception apparatus based on cross correlation functions; and

fourth means for delaying the different frequency band signals of the received signals individually using the estimated delay times and adding the delayed different frequency band signals.

10. A signal processing apparatus according to claim 9, wherein said first means is formed from a plurality of band-pass filters for passing signals of frequency bands different from each other therethrough.

11. A signal processing apparatus according to claim 9, wherein said third means includes:

maximum value detection means for determining delay times with which the cross correlation functions exhibit maximum values for the individual frequency bands for the individual combinations of the reception apparatus and setting the determined delay times as candidate delay

times; and

estimation means for estimating the direction or directions or the position or positions of the signal source or sources so that the candidate delay times may be provided most consistently and estimating the delay times of the individual ones of said reception apparatus based on the estimated direction or directions or the estimated position or positions of the signal source or sources.

12. A signal processing apparatus according to claim 9, wherein said third means includes:

normalization means for normalizing the cross correlation functions for the individual frequency bands;

addition means for adding the cross correlation functions normalized for the individual combinations of said reception apparatus over all or some plurality of ones of the frequency bands; and

estimation means for estimating the delay times of the individual ones of said reception apparatus based on results of the addition of the normalized cross correlation functions.

13. A signal processing apparatus according to claim 12, wherein said estimation means determines the delay times with which the cross correlation functions

added by said addition means exhibit maximum values for the individual combinations of said reception apparatus, sets the determined delay times as candidate delay times, estimates the number and the direction or directions or the position or positions of the signal source or sources with which the candidate delay times are provided most consistently, and then estimates the delay times of the individual ones of said reception apparatus based on the estimated direction or directions or the estimated position or positions.

14. A signal processing apparatus according to claim 12, wherein said addition means performs, where the nature of the signal or each of the signals from the signal source or sources is known in advance, weighted addition so as to emphasize components originating from the received signals but suppress components which originate from noise.

15. A signal processing apparatus according to claim 9, wherein said fourth means determines, upon the addition of the delayed different frequency band signals, weighting coefficients for the individual frequency bands based on values of the cross correlation functions between the different frequency band signals for the estimated delay times and uses the weighting coefficients

to perform weighted addition.

16. A signal processing apparatus according to claim 9, wherein the signal source or each of the signal sources is a sound source.

17. A signal processing apparatus for processing a signal played back from a recording medium on which a signal or signals received from a signal source or a plurality of signal sources through a plurality of reception apparatus are recorded, comprising:

first means for decomposing each of the played back received signals into a plurality of different frequency band signals;

second means for calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus;

third means for estimating delay times of individual ones of said reception apparatus which depend upon the direction or directions or the position or positions of the signal source or sources and an arrangement of said reception apparatus based on cross correlation functions; and

fourth means for delaying the different frequency band signals of the received signals individually using the estimated delay times and adding the delayed different frequency band signals.

18. A signal processing method for processing a plurality of received signals obtained by receiving a signal or signals from a signal source or a plurality of signal sources through a plurality of reception apparatus, comprising:

a first step of decomposing each of the received signals into a plurality of different frequency band signals;

a second step of calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus; and

a third step of estimating the direction or directions or the position or positions of the signal source or sources based on the cross correlation functions.

19. A signal processing method according to claim 18, wherein the third step includes:

a maximum value detection step of determining delay times with which the cross correlation functions exhibit maximum values for the individual frequency bands for the individual combinations of the reception apparatus and setting the determined delay times as candidate delay times; and

an estimation step of estimating the number and the direction or directions or the position or positions of the signal source or sources so that the candidate delay times may be provided most consistently.

20. A signal processing method according to claim 18, wherein the third step includes:

a normalization step of normalizing the cross correlation functions for the individual frequency bands;

an addition step of adding the cross correlation functions normalized for the individual combinations of said reception apparatus over all or some plurality of ones of the frequency bands; and

an estimation step of estimating the direction or directions or the position or positions of the signal source or sources based on results of the addition of the normalized cross correlation functions.

21. A signal processing method according to claim 20, wherein, in the estimation step, the delay times with

which the cross correlation functions added by the addition step exhibit maximum values are determined for the individual combinations of said reception apparatus and the determined delay times are set as candidate delay times and then the number and the direction or directions or the position or positions of the signal source or sources with which the candidate delay times are provided most consistently are estimated.

22. A signal processing method according to claim 20, wherein, in the addition step, where the nature of the signal or each of the signals from the signal source or sources is known in advance, weighted addition is performed so as to emphasize components originating from the received signals but suppress components which originate from noise.

23. A signal processing method according to claim 18, wherein the signal source or each of the signal sources is a sound source.

24. A signal processing method for processing a signal played back from a recording medium on which a signal or signals received from a signal source or a plurality of signal sources through a plurality of reception apparatus are recorded, comprising:

a first step of decomposing each of the played back

received signals into a plurality of different frequency band signals;

a second step of calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus; and

a third step of estimating the direction or directions or the position or positions of the signal source or sources based on the cross correlation functions.

25. A signal processing method for processing a plurality of received signals obtained by receiving a signal or signals from a signal source or a plurality of signal sources through a plurality of reception apparatus, comprising:

a first step of decomposing each of the received signals into a plurality of different frequency band signals;

a second step of calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands

for individual possible combinations of said reception apparatus;

a third step of estimating delay times of individual ones of said reception apparatus which depend upon the direction or directions or the position or positions of the signal source or sources and an arrangement of said reception apparatus based on cross correlation functions; and

a fourth step of delaying the different frequency band signals of the received signals individually using the estimated delay times and adding the delayed different frequency band signals.

26. A signal processing method according to claim 25, wherein the third step includes:

a maximum value detection step of determining delay times with which the cross correlation functions exhibit maximum values for the individual frequency bands for the individual combinations of the reception apparatus and setting the determined delay times as candidate delay times; and

an estimation step of estimating the direction or directions or the position or positions of the signal source or sources so that the candidate delay times may be provided most consistently and estimating the delay

times of the individual ones of said reception apparatus based on the estimated direction or directions or the estimated position or positions of the signal source or sources.

27. A signal processing method according to claim 25, wherein the third step includes:

a normalization step of normalizing the cross correlation functions for the individual frequency bands;

an addition step of adding the cross correlation functions normalized for the individual combinations of said reception apparatus over all or some plurality of ones of the frequency bands; and

an estimation step of estimating the delay times of the individual ones of said reception apparatus based on results of the addition of the normalized cross correlation functions.

28. A signal processing method according to claim 27, wherein, in the estimation step, the delay times with which the cross correlation functions added by the addition step exhibit maximum values are determined for the individual combinations of said reception apparatus, and the determined delay times are set as candidate delay times, whereafter the number and the direction or directions or the position or positions of the signal

source or sources with which the candidate delay times are provided most consistently are estimated, and then the delay times of the individual ones of said reception apparatus are estimated based on the estimated direction or directions or the estimated position or positions.

29. A signal processing method according to claim 27, wherein, in the addition step, where the nature of the signal or each of the signals from the signal source or sources is known in advance, weighted addition is performed so as to emphasize components originating from the received signals but suppress components which originate from noise.

30. A signal processing method according to claim 25, wherein, in the fourth step, upon the addition of the delayed different frequency band signals, weighting coefficients are determined for the individual frequency bands based on values of the cross correlation functions between the different frequency band signals for the estimated delay times and the weighting coefficients are used to perform weighted addition.

31. A signal processing method according to claim 25, wherein the signal source or each of the signal sources is a sound source.

32. A signal processing method for processing a

signal played back from a recording medium on which a signal or signals received from a signal source or a plurality of signal sources through a plurality of reception apparatus are recorded, comprising:

a first step of decomposing each of the played back received signals into a plurality of different frequency band signals;

a second step of calculating cross correlation functions between the different frequency band signals originating from two different ones of said reception apparatus for individual corresponding frequency bands for individual possible combinations of said reception apparatus;

a third step of estimating delay times of individual ones of said reception apparatus which depend upon the direction or directions or the position or positions of the signal source or sources and an arrangement of said reception apparatus based on cross correlation functions; and

a fourth step of delaying the different frequency band signals of the received signals individually using the estimated delay times and adding the delayed different frequency band signals.